

Long Island Botanical Society

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Carnivores of the Plant World in Our Own Backyard

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When I tell people that I study carnivorous plants, they immediately have an image of me swinging from vines in far away exotic lands. Where else would these outlandish-looking, yet strangely beautiful plants grow? Instead, one can find me surrounded by beautiful round-leaf sundews (*Drosera rotundifolia*) and my personal research favorite, the pitcher plant (*Sarracenia purpurea*), right here on Long Island. This does not mean that my search for these amazing plants is not as adventurous as one would imagine in exotic lands. In order to get into the heart of Long Island's carnivorous plant world, one needs to trek across water-logged sphagnum moss without falling in, and constantly be wary of Lyme disease-carrying ticks. But these plants are well worth the adventure. I just try to leave out the more worrisome, adventurous parts when I write home to Mom.

Although they look exotic, carnivorous plants are native throughout North America. They reside in habitats with soil that is low in nutrients, such as bogs of the North and forest savannas in the South (Schnell 2002). In order to survive in these low-nutrient habitats, these plants have specialized mechanisms to lure prey to their traps where they are captured, and then provide the much needed nutrients to the plant. The majority of the prey range from ants to flies, beetles, spiders, and slugs. However, amphibians such as red-spotted newt larvae (Butler et al. 2005) have also been observed inside these traps and ultimately become prey to these plants.

For each type of carnivorous plant, the trap is formed from a modified leaf and can range from one that snaps shut after the prey steps on a trigger hair, like the extremely popular Venus flytrap (*Dionaea muscipula*), to the suction devices of the bladderworts (*Utricularia* spp.), the sticky

droplets and hairs on the sundews (*Drosera* spp.) and butterworts (*Pinguicula* spp.), and the passive pitfall traps formed by the cup-shaped leaves of the pitcher plants (*Sarracenia* spp. in the east and *Darlingtonia californica* in the west). Insects are attracted to these traps by nectar secreted from the leaf and, in all but one species (the northern pitcher plant *Sarracenia purpurea*), are then digested by enzymes secreted by the leaf, releasing nutrients.

The uniqueness of *S. purpurea*'s digestion is as a result of the special relationship this species has formed with an aquatic community composed of bacteria, protozoans, rotifers, and midge and mosquito larvae that reside inside its

cup-shaped leaves. All pitcher plants contain a hood at the tip of their leaves. This hood usually acts as an umbrella that protects the inside of these leaves from most rainfall (Schnell 2002). The hood on *S. purpurea* is exceptional in that it does not cover the top of the leaf, allowing rainfall to be liberally collected. This pool of rainwater, as well as the slippery, downward pointing hairs on the inside of the leaf, make a trapped insect doomed to an untimely death.

The nectar secreted from the leaves of *S. purpurea* attracts mainly ants, and more nectar is secreted by newer leaves, making them better ant traps (Fish and Hall 1978). Once the ant falls inside the leaf, it drowns in the water. Newer leaves are thought to produce some digestive enzymes to help with decomposition, but for the

most part, *S. purpurea* relies solely on the bacteria inhabiting the water collected in the cup-shaped leaves to decompose the ants and convert and release the nutrients so the plant can readily take them up. This relationship between the plant and the bacteria is mutualistic, as *S. purpurea* is mainly nitrogen-limited (cont. pg 27)



Long Island Botanical Society

Founded: 1986
Incorporated: 1989

The Long Island Botanical Society is dedicated to the promotion of field botany and a greater understanding of the plants that grow wild on Long Island, New York.

Visit the Society's Web site
www.libotanical.org

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Society News

New York State Digital Collections. The New York State Library has recently digitized "*A Flora of the State of New-York*" by John Torrey published in 1843. This classic two volume set was scanned from paper copy volumes located in the NYS Library. The set that was digitized includes hand-colored plates; the color plates are listed after each volume. (This two-volume set is part of the Natural History survey of New York.) The documents are full-text searchable and freely available online as PDF documents on the State Library's website.

The State Library has also digitized volumes of the "*Bulletin of the New York State Museum*" from 1887 through 1998. Large maps that were included with the Bulletin were removed and scanned separately on a high quality color scanner.

To view these documents and others, go to the home page of the New York State Library at www.nysl.nysed.gov/ and use the search engine.

Friends of the Edgewood Preserve recently reported a major environmental setback: "Yesterday [6 Aug 2008], Governor David Paterson vetoed Bill S6728a/A9870a (the transfer of Pilgrim land to the Edgewood Preserve), thus caving in to special interests and ignoring a NYS law that says Pilgrim land no longer needed by the hospital must be incorporated into the Edgewood Preserve. The bill passed the Senate 48-7 and the Assembly 143-0. So, the Governor not only ignored the will of his own lawmakers, he ignored the will of the majority of Long Islanders, which is extremely disheartening."

LIBS Publication: "*Tidal Marshes of Long Island, New York*", edited by John Potente, is nearing completion. More than a dozen articles by noteworthy experts in the field are in the final stages of revision and formatting. Printing is planned for October. If all goes well, the final publication will be available by year's end.

Plant Sightings

Reported by Scott A. Kishbaugh NYSDEC: The much anticipated and much feared arrival of *Hydrilla* into New York State and Long Island was realized in August of 2008. *Hydrilla* is native to parts of Asia, Africa, and Australia, was first introduced to Florida in the early 1950s, and has migrated to the northeast, appearing in New Jersey, Pennsylvania, Connecticut, Massachusetts, and Maine in recent years. It is considered to be the most invasive aquatic plant in North America, with the state of Florida spending millions of dollars annually in "maintenance control".

Less than a week after *Hydrilla verticillata* was first confirmed in a small pond in Orange County, New York, this highly invasive exotic plant was also discovered in southwestern Suffolk County by the NYSDEC Division of Water and the Long Island Chapter of The Nature Conservancy (TNC) as part of a continuing series of invasive aquatic plant surveillance activities. It was found growing lushly in two of the three most southern ponds in the Sans Souci Lake chain of ponds in the Sans Souci County Park. *Hydrilla* was also observed in the southern portion of Lotus Lake in the same park system, but the extent of the *Hydrilla* infestation in the lake is not yet known.

New York individuals of *Hydrilla* are believed to be the dioecious [having male and female flowers on separate plants] form, more commonly found in the southeastern United States; the dioecious form presents greater eradication challenges than the monocious [with flowers of both sexes on the same plant] form, more common to the mid Atlantic region. The Suffolk County Department of Parks, Recreation and Conservation is working closely with NYSDEC, LIISMA, TNC, and other partners to evaluate the most appropriate control strategies and plot a course of action.

[NOTE: *Hydrilla verticillata* is a monocot and a member of the Frog's-bit Family, the Hydrocharitaceae, and is related to water-weed (*Elodea*) and tape-grass (*Vallisneria*).]

(continued from pg 25)

while the bacteria are carbon-limited (Gray et al. 2006), thus there is no competition for nutrients between the plant and the bacteria. Instead, both benefit from the insect's nutrients and from each other.

The amount of nutrients that can be released to the plant depends on the abundance of protozoans, rotifers, and midge and mosquito larvae present in the water inside the pitcher plant leaves. The midge larvae break dead ants into smaller pieces, facilitating the decomposition by the bacteria (Heard 1994). The protozoans and rotifers, however, are parasites on the system – they feed on the bacteria, which can then limit nutrient provisions to the plant. The larvae of the pitcher plant mosquito, *Wyeomyia smithii* rectify this situation by feeding on the rotifers and protozoans, rescuing the bacteria (Kneitel and Miller 2002) and increasing the amount of nitrogen released to the plant (Mouquet et al. 2008).

The relationship between the plant and its microscopic leaf community has created a well-oiled machine. A similar microscopic community is found in *S. purpurea* leaves across its entire North American geographic range, from northern Florida through Canada (Buckley et al. 2003). The mosquito *Wyeomyia smithii* is especially interesting, as its larvae are found only in the leaves of *S. purpurea* (Armbruster et al. 2001), and no other mosquito larvae are able to survive there (Petersen et al. 2000).

Any alteration of this microscopic community or of the plant's habitat can affect the amount of nutrients available to *S. purpurea* and will cause changes in its survival and growth. Air pollution, especially nitrogen deposition, is especially threatening to this plant in northern habitats. When too much nitrogen is deposited from the atmosphere, the leaves of *S. purpurea* will no longer open into cup-shapes, causing a loss of this co-evolved microscopic community inside (Gotelli and Ellison 2002). It has also been predicted that with high levels of nitrogen deposition, *S. purpurea* will face extinction in approximately 100 years (Gotelli and Ellison 2002). This, as well as a mixture of habitat loss and other environmental changes, could be extremely detrimental to the *S. purpurea* populations that persist on Long Island. [Editor's note: See related article on page 28.]

This plant and the microscopic community it harbors has interested scientists for decades (e.g., Addicott 1974, Heard 1994, Kneitel and Miller 2002, Gotelli and Ellison 2006) and much insight has already been gained from this research. *Sarracenia purpurea*'s microscopic community has become an ideal model system for conducting experiments on food web interactions, and I am using it as part of my Ph.D. dissertation to address questions about how different factors (environmental and species additions) can affect community development through time. I am also focusing on the relationship between the bacteria and *S. purpurea*. Bacteria play such a key role in the survival of this plant, yet it is unknown where they come from and who they are. I am using new molecular techniques to determine not only who the bacteria are within this community, but also their overall diversity, and whether they are similar across the geographic range of pitcher plants, or if different

bacteria are found in different regions. This work will begin to provide a more detailed insight into this beautifully mutualistic relationship between *S. purpurea* and its bacteria and the implications that environmental changes would have on the bacterial diversity, and thus the survival of this intriguing plant.

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Past and Present Status of *Sarracenia purpurea* on Long Island, New York Eric Lamont

The northern pitcher plant (*Sarracenia purpurea*) is rare on Long Island, although it is relatively common in up-state New York. Historically, it was known to occur in about ten localities on Long Island (Figure 1), but currently it is known from only four sites. Some of the earliest collections are from Queens County and date to the late 1800s; all other known collections are from Suffolk County. Jelliffe (1899) in his *Flora of Long Island* reported *S. purpurea* from Oyster Bay and cited a collection by Bisky, but no voucher specimen can be located for this report. Apparently, it was never reported from Kings County (Brooklyn). Today, all of the Queens County populations of *S. purpurea* are considered to be extirpated. It has not been reported from Nassau County for more than 100 years and has not been reported from western Suffolk County for more than 75 years.

In western Suffolk County, *S. purpurea* was reported from "Belmont Lake Park" on 11 September 1937 by Raymond Torrey and a note was published in the journal *Torrey* (vol. 38, p. 14), but it has not been recently observed at that locality. A worthwhile project for interested individuals would be to try and relocate this historical population; much suitable habitat has been preserved at that locality and chances are good that pitcher plants persist there. A second population from western Suffolk County was reported in 1935 by Henry Conard from the vicinity of Lake Ronkonkoma and a note was published in *The American Midland Naturalist* (vol. 16, p. 495). Once again, suitable habitat still exists in the marshes northeast of Lake Ronkonkoma and visits to the site may reveal that pitcher plants still occur there.

In eastern Suffolk County, *S. purpurea* was collected several times from the vicinity of Calverton and Manorville. In 1919, A. M. Gershoy collected it from the "south end of Swan Pond, northeast of Manorville" and in 1923 William Ferguson collected it from "pine barrens thicket in *Sphagnum*, River Road, Calverton". Stanley Cain collected it in 1936 from along the "north shore of the Peconic River in Calverton". Roy Latham also collected a specimen from Calverton in 1933. These sites are probably near the former cranberry farm that extended from south of Swan Pond to the Peconic River and also used to support extensive populations of native orchids (and some still occur there), but no pitcher plants have been recently reported from these sites although extensive suitable habitat still exists.

Populations of pitcher plants have long been known to occur in the vicinity of Riverhead; E. S. Miller collected the earliest specimen in 1872 while Roy Latham, William Ferguson, and Henry Svenson collected specimens in the late 1920s and early 1930s. Two populations near Riverhead persist today: one in a wet meadow under power lines just south of Stotsky Park in Riverhead Township, the other (probably the largest extant population on Long Island) at Cranberry Bog Preserve in Southampton Township. Two other nearby extant populations are known from western Southampton Township: one along *Sphagnum* edges of a coastal plain pond east of Flanders and the other at Quogue Wildlife Refuge. William Ferguson collected pitcher plants from a "white cedar swamp in pine barrens, east of Flanders" in 1923, and from "between Flanders and Good Ground" in 1929; he also published a note on his findings in 1924 in the *Bulletin of the Torrey Botanical Club* (vol. 51, p. 193). Roy Latham also collected *S. purpurea* from Flanders in 1929.

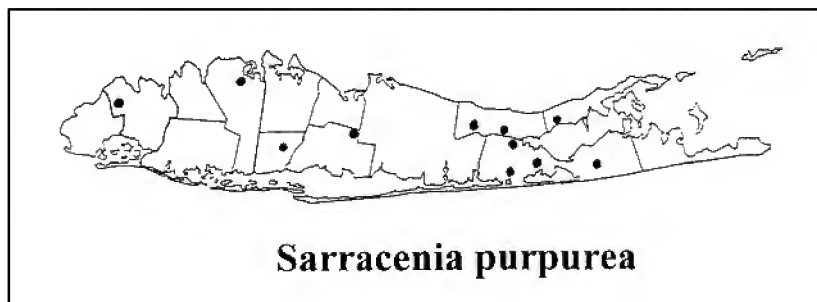
On 4 August 1918, Roy Latham collected "a single plant [of *S. purpurea*] from a bog near Mattituck" on the North Fork and reported it with Steward Burnham in *Torrey* (vol. 21, p. 30). This collection represents the only verified report of *S. purpurea* from Long Island's North Fork, and not surprisingly the population has not been relocated.

On 10 August 1925, William Ferguson collected *S. purpurea* from a "*Sphagnum* bog, Lake Nowedonah, Watermill". In his classic book, "*Indian Place Names on Long Island*", William Wallace Tooker (1911) stated, "Nowedonah: name of

the Shinnecock Sachem in 1648. Now bestowed upon the "Mill Pond" at Water Mill, Southampton town." On 3 August 1939, Roy Latham collected *S. purpurea* from Southampton, but did not give a precise locality. It's possible that Latham's collection was also from Mill Pond. Although the borders of Mill Pond in Water Mill have been relatively developed, dense shrub thickets still occur and suitable habitat for *S. purpurea* may still exist.

Finally, during the late 1960s to the late 1990s, a small population of *S. purpurea* occurred in Smoky Hollow Bog on Fire Island. However, these plants were deliberately introduced to the "bog" by a local nature enthusiast and the plants died out by the early 2000s.

In conclusion, the current status of *S. purpurea* on Long Island is not well known. Certainly the historical populations from Queens County have been extirpated, and the one population from Nassau County also might be extirpated. But the status of several populations from Suffolk County is not known. Relocating historical populations of *S. purpurea* in Suffolk County would be significant botanical finds and a contribution to our understanding of Long Island's native flora.



Every picture tells a story (or some of its parts)

By Christopher Mangels

The name Bob Laskowski should be familiar to most readers of this newsletter. However, to those who don't know, Bob was a founding LIBS member and venerable Long Island naturalist, whose oral history included pre-war experiences on the Hempstead Plains and outings with the likes of Nathaniel Britton and Stanley Cain.



Recently, in going through an old box of sundry tools and hardware that had belonged to Bob, I discovered this small, hitherto unnoticed black and white photograph, clearly dated yet in reasonably good condition. It portrays three men and a woman, all apparently youthful, standing on or in front of a farm truck in what resembles a scene out of Steinbeck's "Of Mice and Men". A date stamped on back of photo reads "May 24 1938".

Upon closer inspection, I recognized Bob as the tall fellow on the right with the smaller guy on his shoulders. With the aid of a lens, I made out that the insignia on the side of truck read "Nassau Cooperative G.L.F. Services, Feed-Seed-Fertilizer-Hay, West Barclay St., Hicksville, L.I., Phone 34". It was interesting though not surprising to place Bob somewhere in Nassau in the late '30's; I knew he had studied agronomy and worked in agriculture before going into the Army. Uncovering a bit more information, I thought, might shed some light on this bucolic scene.

With a little research, I discovered that "G.L.F." was a shortened acronym for The Cooperative Grange League Federation Exchange, a consortium of farmers and farm communities formed in the 1920's, with roots extending back to a post-Civil War movement called the National Grange of the Patrons of Husbandry¹. GLF later merged with two other regional cooperatives, the Eastern States Farmers Exchange and Pennsylvania Farm Bureau Cooperative Association, to form Agway, Inc. in 1964². The scene in the photo became more interpretable because I knew Bob had retired from Agway, after many years of service, sometime before I met him around 1984.

The exact location of the scene, the identities of the other individuals, and the associations between people and place all remain a mystery to me--and probably forever will. The place has undoubtedly been transformed. But I find this glimpse of Long Island from a bygone era interesting in its depiction of a man from The Bronx in the early days of his chosen career in an agricultural realm approaching, historically speaking, its last days.

¹ Knapp, Joseph G., "Seeds That Grew," New York: Anderson House, 1960.

² White, Nathaniel E., "The Birth of Agway: Northeast Agriculture in Transition," Dewitt, N.Y.: Agway, Inc., 1989.

Restoring Tidal Wetlands of Sunken Meadow Creek

Gary Lawton

Regional Environmental Manager,
Long Island State Park Region

Sunken Meadow Creek, located within Sunken Meadow State Park, is one of the largest tributaries of the Nissequogue River and was once a healthy tidally dominated river system. During the 1940s a dike was constructed across the creek and fitted with two corrugated metal 36 inch diameter culverts to carry tidal flows. These culverts were inadequate to transfer the water and over time tidal exchange has been severely limited. This has led to a reduction of tidal flow, a reduction in salts and a significant shift in the ecology of the system which now favors non-tidal brackish marsh habitat.

As of the mid 1970s *Spartina alterniflora*, *S. patens* and *Distichlis spicata* still dominated this habitat. However, since that time with the loss of tidal exchange, this plant community has given way to large monocultures of *Phragmites australis*. Further, the culverts have created a bottleneck for anadromous and resident fish species that are forced to move through these structures. The reduction in flow across the culverts has impacted water quality by accumulating nutrients and increasing temperatures. The conditions we see here and the changes that have occurred are common to coastal systems throughout the region.

State Parks recently applied for a Long Island Sound Futures grant to fund an engineering study to determine how best to increase tidal flow across the dike and provide access for diadromous fish. Restoration of tidal flow would re-connect 73 acres of vegetated wetland and 38 acres of underwater lands to tidal flushing that will help to improve water quality in the receiving waters to Long Island Sound and restore the tidal salt marshes.

Marshes that have been restricted for decades lose elevation and become lower than their downstream counterparts. Although this has the benefit of allowing greater restoration with limited flooding it also means that we must insure that whatever flows are reestablished do not overwhelm the marshes and convert them to open water habitat. To maximize the extent of habitat restoration while protecting the park's resources, it will be important to model the flows that may occur under different restoration alternatives. These alternatives include the removal of the dike, replacing and upgrading the culverts and the creation of an open water channel with a flood control structure. The engineering study will enable Parks and its partners to determine the most practicable course of action to take that restores tidal flow, maximizes restoration of the tidal wetlands and enhances fish passage.

As part of this project, partners have assisted State Parks in conducting elevation surveys, conducting natural resource inventories, and alewife surveys. The Long Island Botanical Society is one of our partners and will be assisting

Parks with identifying plant communities, looking for rare plants and ultimately, once the engineering study is done, will assist Parks with developing a plan for the restoration of this valuable resource.

State Parks appreciates the sharing of expertise and recommendations provided by the U.S. Fish & Wildlife Service, N.Y.S. Department of Environmental Conservation, U.S. Environmental Protection Agency and other partners including the Long Island Botanical Society. With everyone's assistance it is hoped that this project will move forward for the restoration of this valuable resource.

[Editor's note: Eric Lamont reports that LIBS has recently completed the above-mentioned floristic survey of the Sunken Meadow Creek watershed area.]

Announcements and Requests

Dr. Mark Brand of the University of Connecticut is actively breeding and evaluating germplasm of *Aronia* species (chokeberries) as potential replacements for invasives such as *Euonymus alatus*. Could you email me some specific field locations where material might be collected? Dr. Brand is particularly interested in *Aronia arbutifolia* (red chokeberry) and ESPECIALLY the purported dwarf genotypes that inhabit xeric and coastal areas such as (perhaps) the Pine Barrens, Hempstead Plains, etc. In your responses, please try to indicate whether you're referring to *A. arbutifolia*, dwarf *A. arbutifolia* or *A. melanocarpa* (black chokeberry). Contact Jon Lehrer, at lehrerjm@farmingdale.edu



Oak wilt - a lethal disease of red oaks - is now present in New York State. Oak wilt is a disease in the same class as Dutch elm disease, and has no real cure. More information is available at <http://www.fingerlakesprism.org/>.



The Cornell Cooperative Extension Invasive Species Outreach Program is excited to announce an invasive species in-service education opportunity, "Education: The Lynch Pin in Invasive Species Prevention and Management Efforts", which is being offered on November 11-13. For information, contact Chuck O'Neill at cro4@cornell.edu



This Field Botanist is Prepared for Anything!!

(Photo by Joanne Tow)

FIELD TRIPS

OCTOBER 4, 2008 (SATURDAY) 10 AM

Blydenburgh County Park, Smithtown, Suffolk Co., NY

Trip Leader: Daniel Karpen

Blydenburgh County Park contains New Mill Pond, the second largest body of fresh water on Long Island, AND has a population of old growth Black Gum trees, *Nyssa sylvatica*, estimated at 500 or more years old. The trip will examine these old growth trees and possibly circumnavigate the pond, if participants wish to. The trees are about 1 mile from the parking lot.

Directions: Meet at parking lot at north end of Blydenburgh Park. From Route 25-25A in Smithtown, go south on Brooksite Dr.; at next light (New Mill Rd.), turn right and travel to the end of the road, making the last possible left. At the end of Mill Road, travel past a Blydenburgh County Park sign, to parking area. From Route 347, find Brooksite Dr. between the 347-454 junction and Rt. 111; head north on Brooksite to New Mill Rd.; go left onto Mill Road, to parking area. Daniel Karpen phone: 631-427-0723.

OCTOBER 11, 2008 (SATURDAY) 10 AM

Prospect Park, Brooklyn, Kings County, NY

Trip Leaders: Andy Greller and Jessica DiCicco, Forest Ecologist

We are gathering to do a list of the plants growing without cultivation in Prospect Park. Additionally, we will evaluate the success of earlier restoration plantings of native wildflowers.

Directions: the meeting location is the Audubon Center at the Boathouse in Prospect Park. Driving from Eastern Parkway: Head west on Eastern Parkway turning left at Bedford Ave. Continue on Bedford for 0.5 miles and turn right at Empire Blvd. After 0.3 miles turn left at Ocean Ave. In 0.6 miles take the entrance into the park merging onto the park drive. Continue on the park drive to the blinking light and turn left into the Wollman Rink parking lot. Parking in this lot is open to the public, just be sure to be in a designated spot. From the parking lot walk northwest diagonally through the concert grove (large London plane trees and busts of famous composers). Continue under the bridge and take the path to the right. You should pass our wonderful Camperdown Elm on your right. The Boathouse is the first building on your left. This is the meeting spot.

Subway from the Prospect Park B, Q, S stop: Exit the station at Lincoln Road. The park is a block west. Cross the main drive walking west. Continue under the bridge and take the path to the right. You should pass our wonderful Camperdown Elm on your right. The Boathouse is the first building on your left.

CORRECTION:

The last issue of the LIBS Newsletter (Summer, Vol. 18 No. 3) was incorrectly labeled as "Spring, Vol. 18 No. 2".

UPCOMING PROGRAMS

A October 14, 2008* Tuesday, 7:30 PM

Joe Zysman: "The Nature of the Fire Island Wilderness Area." This talk is about the flora and fauna of the Fire Island Wilderness Area within the Fire Island National Seashore. It will also cover related issues such as planning processes that affect Fire Island as well as the history of Fire Island. Joe is President of the Fire Island Wilderness Committee.

*Location: Bill Paterson Nature Center,
Muttontown Preserve, East Norwich*

November 11, 2008* Tuesday, 7:30 PM

Jamie Boyer: "Modeling the Telome Theory - Simulations of Early Land Plant Development." For well over 50 years, the Telome Theory of Walter Zimmermann has been extremely influential in interpreting the evolutionary history of land plant architecture. Modeling techniques have been employed to create a detailed description of theoretical 'elementary processes' proposed by Zimmermann and to ascertain developmental information from the fossil record. Jamie is a Ph.D. candidate at SUNY Binghamton, where he studies the evolution and development of

early land plants, and is the Associate Director of Teacher Professional Development at The New York Botanical Garden.

*Location: Museum of Long Island Natural Sciences,
Geosciences Building, Gil Hanson Room (Room 123)
SUNY at Stony Brook, Stony Brook*

December 9, 2008* Tuesday, 7:30 PM

Andy Greller: "Rainforests of Southern South America." Learn from the LIBS VP whose areas of expertise include both forest ecology and tropical biology. Andy is a Past President of the Torrey Botanical Society, a member of the LIBS Local Flora Committee, and is currently leading other LIBS members in field work to update the Flora of Queens County.

*Location: Bill Paterson Nature Center,
Muttontown Preserve, East Norwich*

⇒Don't forget that our schedule has changed, and there will be no meetings in January or February.

* Refreshments and informal talk begin at 7:30.
Formal meeting starts at 8:00 PM.
Directions : 516-354-6506